Possible theory-expt collaboration: V+jets

Try to motivate this from the perspective of performing an inclusive SUSY search in the lepton(μ or e)+jets+Etmiss channel with early ATLAS data.

Rough estimate of 5σ discovery limit with 100pb^{-1} at 10 TeV is m($\tilde{q}$ or $\tilde{g}$) ~ 600 GeV. (Current Tevatron limit with 2 fb^{-1} is around 400 GeV)

Potential SM background processes include:

- QCD multijets
- W(ℓν) + jets
- tt → bbℓνℓν or bbℓνqq

Dominant background seems to be tt → bbℓνℓν where one lepton is not identified

Desirable to be able to estimate each of the backgrounds separately.

Much recent effort in ATLAS on "data-driven" SM background estimation methods (see the recent ATLAS "book" arXiv:0901.0512)

Probably no alternative for estimating bkg from QCD multijets, but should not neglect Monte Carlo approach for the other backgrounds.

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So, questions to the theory group (and possible collaboration?):

- What are the current limits to theoretical understanding of W+jets (or ttbar) production and kinematics?
- What can experimentalists measure to improve the situation?
- Particularly interested in extreme regions of phase space (cuts are approximate):
  - $H_T > 400$ GeV ($H_T \equiv \sum p_T^{jets}$)
  - MET > 80 GeV
  - $M_T > 100$ GeV
- Some people have started thinking about using Z+jets to estimate W+jets background. For better statistics, photon+jets might be useful (idea from CMS, first made known to us at Brookhaven Forum 2008; thanks!). What are the theoretical issues?